Revelations from Sample D

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March 28, 2006

Sample D as used

- 1/1000th random sample of registration renewals
- If drawn after 1/1/2002 through 12/31/2005
- Not if at a shop in the Bay Area or unclassified
- An ASM test result required (not just aborted)

- 25,013 vehicles
- Previous test cycle observed for 24,383
- Subsequent cycle expected for 11,610

Example of a vehicle drawn as part of Sample D

VIN JT2SV12E0G0403777

CA plate 2COE332, ‘86 Toyota Camry

- RG161757, 11/08/2001,14:10, 140616, B, P
- RF194916, 11/18/2003,10:02, 154438, **D**, F
- RF194916, 11/18/2003,10:48, 154439, D, P
- TB203710, 11/17/2005,10:08, 160335, P, F
- TB203710, 11/18/2005,10:51, 160348, P, P

RF194916: La Jolla Chevron

Fail rates for “first” test

- Overall, 14.3% failed (3,590 vehicles)
- 41.8% of Sample D had first test at a Test Only shop
- Of those tested at Test Only shops, 15.7% failed
- Of those tested at Test & Repair shops, 13.4% failed

Fail rates by type of shop

Test Only (10,468 vehicles tested)	15.7%
Gold Shield (2,058)	14.4%
Dealers (804)	6.6%
Other Test & Repair (11,683)	13.7%

Fail reasons by type of shop

	% of fails tampered
Test Only (1,644 fails)	7.2
Gold Shield (296)	6.4
Dealers (53)	5.7
Other Test & Repair (1,597)	5.5

Fail reasons by type of shop

	% of fails visual	% of fails MIL/OBD
Test Only	14.8	28.2
Gold Shield	9.5	29.0
Dealers	11.3	28.3
Other T&R	10.3	27.3

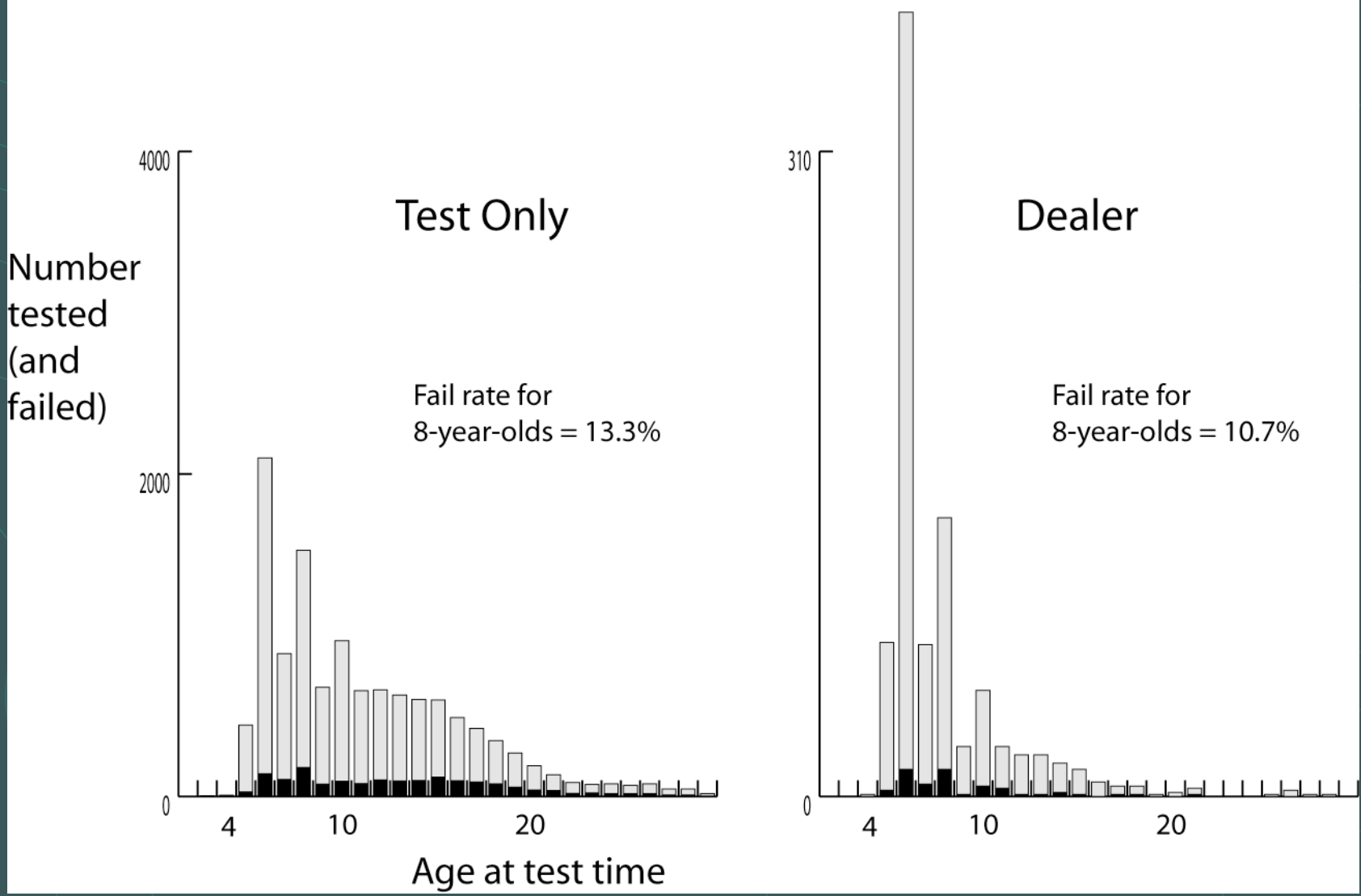
Test styles by type of shop

	% so-called pre-tests	% preceded by an abort
Test Only	0.6	3.1
Gold Shield	1.6	1.7
Dealers	2.6	6.0
Other T&R	4.9	6.2

Correction of failed vehicles

	% never	% within 24 hours	% same shop
Test Only	20.3	22.7	51.0
Gold Shield	20.3	33.8	60.1
Dealers	13.2	49.1	69.8
Other T&R	13.5	35.8	60.4

Age profile for D sample vehicles



Differences in fail rates

Gold Shield	–1.3%
Dealer	–9.1%
Other Test & Repair	–2.0%

Differences relative to Test Only

Fail differences, controlling for age of vehicle

Gold Shield	0.4%
Dealer	–5.0%
Other Test & Repair	–0.6%

Regression R^2 without age included= 0.002; with age = 0.037

Controlling for age, mileage, type, manufacturer

Gold Shield	0.8%
Dealer	–3.3%
Other Test & Repair	–0.5%

Regression R^2 including these variables = 0.062

Also controlling for style and place of test

Gold Shield	0.6%
Dealer	–4.2%
Other Test & Repair	–1.7%

Regression R^2 including these variables = 0.076

Also controlling for previous test cycle

	Difference from TO	t-stat
Gold Shield	0.5%	0.64
Dealer	–3.7%	–3.00
Other T & R	–1.6%	–3.45

Regression R^2 for this subsample of 24,383 vehicles and without these history variables = 0.076; with the history variables = 0.091

Effect of control variables

	Change in fail rate	t-staT
One year older	1.1%	14.57
10,000 more miles	0.7%	17.96
Heavy van (T,5)	1.8%	2.16
Toyota	–3.3%	–1.53
VW	6.5%	2.33
Mercedes	0.5%	0.22

Relative to a light passenger car by the group of small manufacturers (e.g., Fiat, Jaguar, Saab, AMC)

Effect of control variables

	Change in fail rate	t-stat
Pre-test (Q)	24.1%	17.69
Preceded by abort	2.9%	2.90
In South Coast	–0.5%	–0.77

Effect of test history

	Change in fail rate	t-stat
Change of ownership (C)	1.8%	3.55
Initial registration (I)	2.9%	3.33
Directed to TO	–5.7%	2.24
Volunteer to TO	–6.6%	2.55
Failed	14.6%	18.90
Same shop	–1.6%	–2.94

Relative to a passed biennial test at a T&R shop different from the shop in the current cycle of tests for the D code

Selection of current shop

	Change in TO selection probability	t-stat
One year older	0.4%	3.94
10,000 more miles	0.1%	2.23
Heavy van	2.2%	1.82
Toyota	–1.8%	–0.58
VW	8.2%	2.06
Mercedes	3.3%	0.93

Relative to a passed biennial test at a T&R shop, and measured in percent rather than in proportion

Regression R^2 including all control variables = 0.085

Effect of test history on selection of TO for current test

	Change in TO selection probability	t-stat
Change of ownership (C)	0.4%	0.55
Initial registration (I)	2.6%	2.13
Directed to TO	9.1%	2.54
Volunteer to TO	15.8%	4.32
Failed	–1.3%	–1.15

Relative to a passed biennial test at a T&R shop

Increase in regression R^2 by including “history” variables = 0.063

Decision not to retest after fail

	Change in "junk" rate	t-stat
One year older	0.8%	4.41
10,000 more miles	0.4%	4.43
Heavy van	0.4%	0.16
Toyota	–8.8%	–1.61
VW	2.4%	0.35
Mercedes	–11.3%	–1.72

3,472 vehicles failed, of which 580 (15.3%) were not retested within 90 days

Regression R^2 including all control variables = 0.062

Effect of test style and location on decision not to retest

	Change in "junk" rate	t-stat
Gold Shield	–1.2%	–0.51
Dealers	–1.6%	–0.30
Other T&R	–4.2%	–3.02
Pre-test (Q)	–18.4%	–7.69
Fail from tampered	–6.7%	–1.95
Fail from visual	6.0%	2.34
Preceded by abort	5.4%	2.12
In South Coast	2.7%	1.49

Increase in regression R^2 with these variables = 0.007

Effect of test history on decision not to repair and retest

	Change in "junk" rate	t-stat
Change of ownership (C)	3.9%	2.45
Initial registration (I)	9.9%	4.02
Directed to TO	2.4%	0.48
Volunteer to TO	0.9%	0.17
Failed	2.9%	1.85

Increase in regression R^2 by including "history" variables = 0.011

Retirements before the next registration

- Among this Sample D, 11,610 vehicles could have been reregistered during 2004-2005
- Of these, 2,257 were not tested and reregistered (19.4%)

Decision not to attempt to re-register

	Change in "junk" rate	t-stat
One year older	2.3%	17.08
10,000 more miles	0.5%	6.62
Heavy van (T,5)	–4.3%	–3.02
Toyota	–2.1%	–0.62
VW	15.7%	3.51
Mercedes	–2.4%	–0.61

Regression R^2 including all control variables = 0.087

Effect of test style and location on decision not to reregister

	Change in "junk" rate	t-stat
Gold Shield	–0.1%	–0.03
Dealer	–2.0%	–1.11
Other T&R	–1.0%	–1.18
Pre-test (Q)	1.0%	0.42
Fail from tampered	4.2%	0.65
Fail from visual	3.6%	0.81
Preceded by abort	1.1%	0.69
In South Coast	0.6%	0.60

Increase in regression R^2 with these variables = 0.002

Effect of distant history on decision not to reregister

	Change in "junk" rate	t-stat
Change of ownership (C)	2.3%	2.95
Initial registration (I)	8.6%	6.20
Directed to TO	9.3%	1.29
Volunteer to TO	11.4%	1.53
Failed	1.6%	1.05

Increase in regression R^2 by including history prior to the D sample cycle = 0.021

Failures at the next registration

- Among this Sample D, 9,353 vehicles were tested again during 2004–2005 (at least one year after the D test cycle)
- Of these, 1,330 failed (14.2%)

Fails in subsequent cycle

	Change in fail rate	t-stat
One year older	1.1%	7.98
10,000 more miles	0.7%	10.11
Heavy van (T,5)	1.5%	1.05
Toyota	–5.7%	–1.69
VW	0.1%	0.01
Mercedes	–4.3%	–1.10

Regression R^2 including all control variables = 0.079

Effect of test style on new test

	Change in fail rate	t-stat
Change of ownership (C)	17.7%	2.34
Pre-test (Q)	30.8%	12.74
Directed to TO	4.0%	0.42
Volunteer to TO	2.3%	0.24
Gold Shield	1.3%	0.14
Dealer	–5.3%	–0.56
South Coast	–0.7%	–0.43

Relative to a passed biennial test at a regular T&R shop

Effect of Sample D's test style and result on subsequent failure

	Change in fail rate	t-stat
Gold Shield	–0.4%	–0.34
Dealer	–1.2%	–0.65
Other T&R	0.9%	1.10
Fail	15.4%	8.82
Fail from tampered	4.3%	0.58
Fail from visual	–5.3%	–1.04
Preceded by abort	3.8%	2.31

Increase in regression R^2 with these variables = 0.013

Categories of subsequent tests

Of the 9,353 vehicles with a subsequent test more than one year later (whether the cycle was completed or not), the classification was:

212 as Q (pre-test)

59 as C (change of ownership)

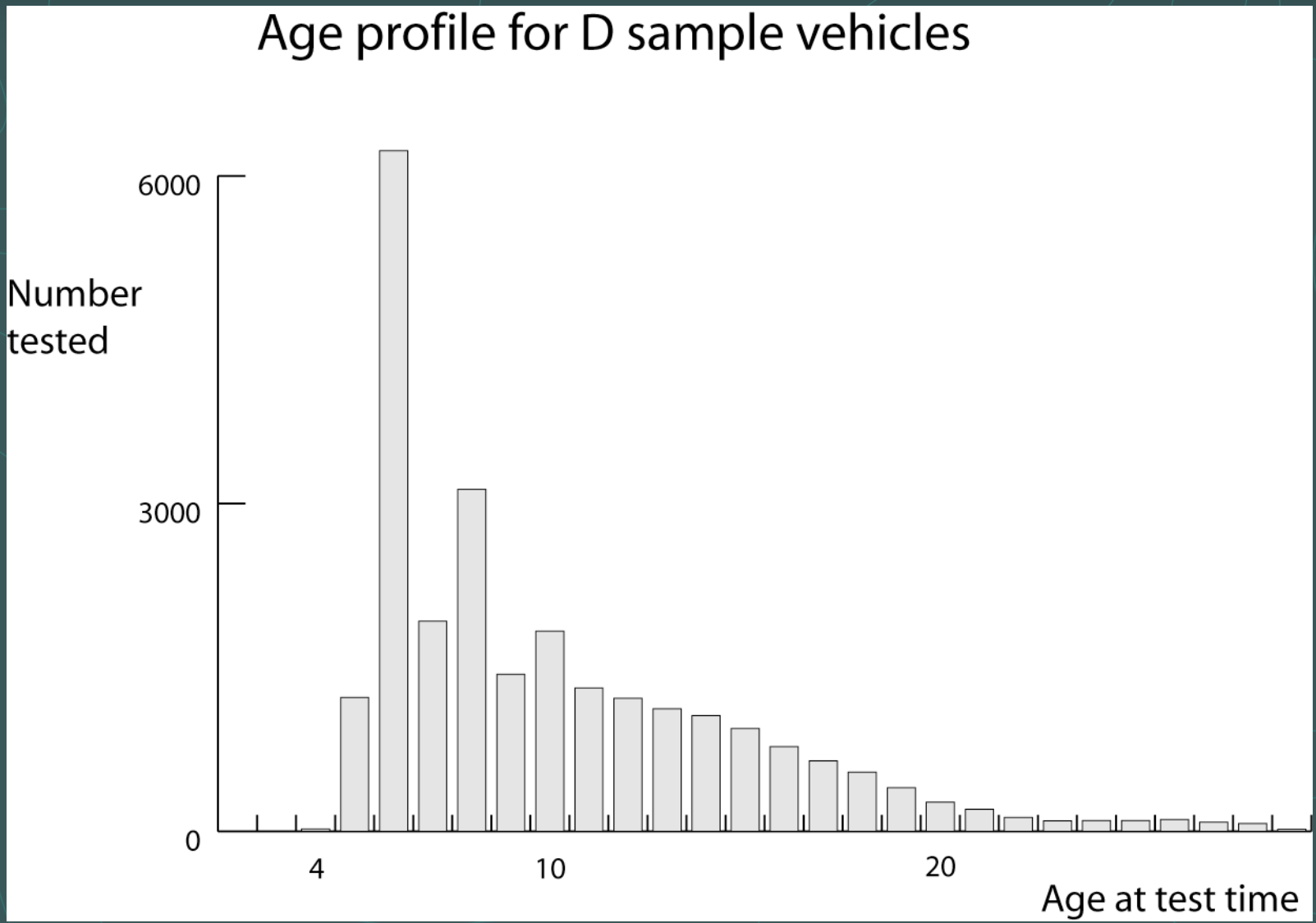
191 as I (initial test)

3,267 as P (directed to TO by HEP)

318 as S (directed by 1.9% random sample)

20 as B (regular biennial test)

5,284 as D (0.1% random sample)


Age profile for D sample vehicles
6000
3000
0
Number tested
4
10
20
Age at test time

Conclusions

- Considerable self selection
- History of individual vehicle matters most of all
- Test results influence retirements
- Controlling for self selection reduces apparent differences among stations
- Dealers appear to be most different from Test Only